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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Group No.: 1764

Examiner: Ridley, Basia

Serial No.: 10/015,042

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Title: COMPACT COMBINED SHIFT AND SELECTIVE METHANATION REACTOR FOR CO CONTROL

RESPONSE TO RESTRICTION REQUIREMENT

Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

This communication is being filed in response to the Office Action mailed 22 April 2004 in which the Examiner has indicated that the referenced application is subject to a restriction requirement. Applicants note that the cover sheet accompanying the Office Action indicated a mailing date of 27 January 2004 even though the details of the action indicate that the Office Action is responsive to Applicants' response to said earlier Office Action. As a result, the undersigned

I hereby certify that this correspondence (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

17 May 2004

17 May 2004
Date

Mark R. Jung
Signature

conducted a brief telephone interview with the Examiner to obtain clarification during the course of which the Examiner indicated that the actual mailing date of the Office Action is 22 April 2004. Accordingly, Applicants are responding in reliance of the Examiner's confirmation of the actual mailing date of the current Office Action.

Claims 1-17 are currently pending in the referenced application. Applicants note that this Office Action constitutes the second requirement for election/restriction issued in connection with the subject application. In the aforementioned Office Action mailed 27 January 2004, the Examiner required an election of species. In view of Applicants' response to that election requirement, the Examiner has withdrawn the previous election of species requirement and has set forth in the current Office Action new election/restriction requirements. It is, however, unclear to Applicants as to the bases for the election/restriction requirements. In particular, the Examiner, having withdrawn the original election of species requirement as set forth in the Office Action mailed 27 January 2004, nevertheless indicates that Claims 1-17 are still subject to an election of species requirement, but provides no basis or support for such a requirement. Indeed, the Examiner cites MPEP § 806.05(e) and MPEP § 806.05(d) as the bases for the election/restriction requirement, neither section of which relates to an election of species requirement. Rather, MPEP § 806.05(e) is directed to "Process and Apparatus

for Its Practice - Distinctiveness" and MPEP § 806.05(d) is directed to "Subcombinations Usable Together". In view of these circumstances, Applicants' response to this Office Action is premised upon the Examiner's citations of MPEP § 806.05(e) and MPEP § 806.05(d) as the bases for the election/restriction requirement.

The Examiner has indicated that restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-9 and 17, drawn to an apparatus.

II. Claims 10-16, drawn to a method, classified in class 423, subclass 656.

Applicants respectfully traverse this election/restriction requirement. The Examiner has indicated that Inventions II and I are related as process and apparatus for its practice which are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. In the instant case, the Examiner argues that the apparatus as claimed can be used to practice another and materially different process such as one which does not require the third stage reformate fuel gas stream to have CO content less than about 50 ppm. Applicants respectfully urge that *the process cited by the Examiner in support of this election/restriction requirement, i.e. one which does not require the third stage reformate fuel gas stream to have CO content less than about*

50 ppm, is not another and materially different process from the process claimed by Applicants in the subject application.

The process (method) claimed by Applicants is a method for reducing the CO content of a reformate fuel gas having three basic steps: (1) contacting the reformate fuel gas with at least one water-gas shift catalyst to form a first stage reformate fuel gas having a reduced CO content; (2) contacting the first stage reformate fuel gas having said reduced CO content with a catalyst mixture comprising both a water-gas shift catalyst and a methanation catalyst to form a second stage reformate fuel gas having a further reduced CO content compared to the first stage reformate fuel gas; and (3) contacting the second stage reformate fuel gas with at least one methanation catalyst to produce a third stage reformate fuel gas in which the CO content is less than about 50 ppm. Applicants note that *the only difference between the method claimed by Applicants and "another and materially different process" cited by the Examiner in support of the election/restriction requirement is the degree to which the third step is carried out,* that is to reduce the CO content in the reformate fuel gas to less than about 50 ppm. That is, *the process cited by the Examiner and the method of the invention claimed by Applicants have the same three steps.* Applicants respectfully urge that a mere change in the degree to which the last step of the method claimed by Applicants does not constitute the recitation of "another and material

different process" in accordance with the requirements of MPEP § 806.05(e) as alleged by the Examiner. Accordingly, Applicants respectfully request that the election/restriction requirement be withdrawn.

Notwithstanding, Applicants hereby elect to prosecute Invention I, Claims 1-9 and 17, drawn to an apparatus.

The Examiner has indicated that, if Applicants elect to prosecute Claims 1-9 and 17, a further restriction to one of the following inventions is required under 35 U.S.C. 121:

A. Claims 1-9, drawn to a reactor for conversion of hydrocarbon fuel, classified in class 48, subclass 127.9; and

B. Claim(s) 17, drawn to a system for producing electricity, classified in class 429, subclass 19.

The Examiner argues that the inventions are distinct, each from the other, on the basis that Inventions A and B are related as subcombinations disclosed as usable together in a single combination (MPEP § 806.05(d)). The Examiner further argues that the subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, the Examiner argues that invention B has separate utility such as the production of electricity. For the following reasons, Applicants respectfully traverse this election/restriction requirement.

Claim 1 of the subject application reads as follows:

1. A reactor for CO control comprising:

a reactor vessel having a water-gas shift catalyst zone, a mixed catalyst zone downstream of the water-gas shift catalyst zone, and a methanation catalyst zone disposed downstream of the mixed catalyst zone;

at least one water-gas shift catalyst disposed in said water-gas shift catalyst zone;

at least one methanation catalyst disposed in said methanation catalyst zone; and

a mixture of said at least one water-gas shift catalyst and said at least one methanation catalyst disposed in said mixed catalyst zone.

Claim 5 of the subject application reads as follows:

5. An apparatus for conversion of a hydrocarbon fuel to a fuel gas suitable for use in a fuel cell comprising:

a reformer vessel suitable for reforming said hydrocarbon fuel to a reformed gas mixture comprising CO, CO_2, H_2O and H_2;

a reactor vessel having a water-gas shift catalyst zone, a mixed catalyst zone downstream of said water-gas shift catalyst zone, and a methanation catalyst zone downstream of said mixed catalyst zone in fluid communication with said reformer vessel; and

at least one water-gas shift catalyst disposed in said water-gas shift catalyst zone, at least one methanation catalyst disposed in said methanation catalyst zone, and a mixture of said at least one water-gas shift catalyst and said at least one methanation catalyst disposed in said mixed catalyst zone.

Claim 17 of the subject application reads as follows:

17. In a system for generating electricity comprising at least one fuel cell and at least one fuel processor, the improvement comprising:

said at least one fuel processor comprising a reformer vessel suitable for reforming said hydrocarbon fuel to a reformed gas mixture comprising CO, CO_2, H_2O and H_2;

a reactor vessel having a water-gas shift catalyst zone, a mixed catalyst zone downstream of said water-gas shift catalyst zone, and a methanation catalyst

zone downstream of said mixed catalyst zone in fluid communication with said reformer vessel; and

at least one water-gas shift catalyst disposed in said water-gas shift catalyst zone, at least one methanation catalyst disposed in said methanation catalyst zone, and a mixture of said at least one water-gas shift catalyst and said at least one methanation catalyst disposed in said mixed catalyst zone.

MPEP § 806.05(d) states:

"Two or more claimed subcombinations, disclosed as usable together in a single combination, and which can be shown to be separately usable, are usually distinct from each other.

Care should always be exercised in this situation to determine if the several subcombinations are generically claimed. See MPEP § 806.04(b)."

Applicants respectfully urge that the Examiner has not identified the two or more claimed subcombinations to which the Examiner is referring in requiring the election/restriction. In addition, the Examiner has not shown how the two *subcombinations* to which the Examiner is referring are separately usable. In this regard, Applicants note that *the Examiner's arguments regarding separate use appear to be directed to the claimed invention and do not address the usability of the specific subcombinations as required by MPEP §806.05(d).* As to the Examiner's arguments regarding separate uses for the claimed invention, Independent Claim 1 recites a reactor vessel with three different catalyst zones, each zone having a catalyst or catalyst mixture suitable for performing the function of the particular zone in which it is located. Independent Claim 5 recites a fuel reforming vessel in combination with the reactor vessel recited in Claim 1. The preamble of Claim 5 indicates the purpose

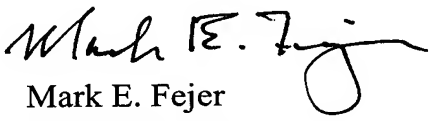
of the claimed apparatus to be converting a hydrocarbon fuel to a fuel gas suitable for use in a fuel cell, the fuel cell being a device for generating electricity. Independent Claim 17 recites the same combination as Independent Claim 5 with the addition that the reformer vessel is part of a fuel processor. The preamble to Claim 17 indicates that the fuel processor is combined with a fuel cell for the purpose of generating electricity. *Applicants respectfully urge that the recitation of a fuel cell in both Claims 5 and 17 makes it clear that the application of the invention claimed therein is the generation of electricity, since that is the purpose of a fuel cell.*

MPEP § 806.05(c) II indicates that *restriction is improper where there is no evidence that a combination is unpatentable without the details of the specific subcombination.* That is, where the relationship between the claims is such that the separately claimed subcombination constitutes the essential distinguishing feature of the combination as claimed, the inventions are not distinct and a requirement for restriction must not be made, *even though the subcombination has separate utility.* In the instant case, Applicants respectfully urge that *the distinguishing features of the alleged subcombinations are the same in both Claims 5 and 17,* namely a reactor vessel with three different catalyst zones, each zone having a catalyst or catalyst mixture suitable for performing the function of the particular zone in which it is located. Accordingly, Applicants respectfully urge that the requirement for

election/restriction in the instant case is improper and, thus, respectfully request that it be withdrawn.

Notwithstanding, Applicants hereby elect to prosecute Claims 1-9 of the subject application.

Respectfully submitted,



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